



Memorandum

June 13, 2017

TO: Sharon Mertens; Steve Unger

FROM: Alfredo Sotomayor *AS*

COPY: J. Nanes; Z. Vogel

SUBJECT: Milorganite® Bacteriological Report – June 2017

Enclosed you will find the results of three Milorganite® samples the MMSD Central Laboratory received for analysis of total coliforms and fecal coliforms this month. Samples were collected past the dust suppressant application and at a location right before product is loaded for shipment by rail. The samples were maintained on ice from collection to arrival at the laboratory. I have enclosed the chain of custody for the samples, the analytical report, and the corresponding bench sheets demonstrating analyses were initiated within hold times.

All samples were accompanied by the required laboratory quality control analyses. All tests were performed by MMSD Central Laboratory in Milwaukee, WI (Wisconsin Certification #: 241325920, Florida NELAP Certification #: E571010).

Please contact me if there are any questions or comments regarding these data, or if you would like additional information about the analyses.



Milwaukee Metropolitan Sewerage District
260 West Seeboth Street, Milwaukee, WI 53204

June 2017 - Milorganite Bacteriological Report

Sample Date	LIMS#	Source Code	QA Code	%TS	TC MPN/gTS	TC Flag	FC MPN/gTS	Log FC	FC Flag	LOD
6/7/17	17011871	978	000	93.13	8.48		< 1.94	0.29		1.94
6/7/17	17011872	978	000	92.87	0.85		< 0.19	-0.72		0.19
6/7/17	17011873	978	000	92.93	< 1.94		< 1.94	0.29		1.94

***Geometric Mean of Fecal Coliform Values: 0.89**

*** If this geometric mean is calculated from indeterminate data, the result must be considered a maximum value.**

%TS - %Total Solids

TC MPN/gTS - Total Coliform Most Probable Number per gram Total Solids

FC MPN/gTS - Fecal Coliform Most Probable Number per gram Total Solids

LOD - Limit of Detection

Log - logarithm (base 10)

Prepared sample bottles contain residual water as a result of the sterilization process. These samples may not reflect the %TS of the prepared product.

VWM-MMSD Sample Chain of Custody
 Sample Location: Jones Island Milorganite Production

Sample Date: 6-7-17

# of Bottles	Source Code	Sample ID	Analyses Requested							Type (grab, comp)	Preservative	Sample Time(s)			For Laboratory Use Only		
			Total Coliform	Fecal Coliform									Start Time	End Time	Preserved Time	LIMS #	pH verified
1	978	Milorganite: Fecal Coliform 1	X	X						Grab	None	0600				17011871	
1	978	Milorganite: Fecal Coliform 2	X	X						Grab	None	0605				17011872	
1	978	Milorganite: Fecal Coliform 3	X	X						Grab	None	0610				17011873	

Silo ID: 9,13 (85%, 15%)

Lot Number: 1719, 1713

Remarks (any unusual conditions must be recorded here and supervisor informed):

VWM Sample Custody

Relinquished by:	Date	Time	Received by:	Date	Time
<i>Stammf Unger</i>	6/7/17	0630	<i>Stammf Unger</i>	6/7/17	0630
<i>Dag F</i>	6/7/17	0649			

Sample Courier Custody

Microbiological samples must be refrigerated upon collection and transported on ice

Received by:	Date	Time	Relinquished by:	Date	Time	On Ice?
						Y / N

MMSD Lab Sample Custody

Received by:	Date	Time	On Ice?	Relinquished by:	Date	Time
<i>E. J. [Signature]</i>	6-7-17	0649	(Y) N			

If not received on ice, sample temperature on receipt in lab: _____ °C

Lab Notes:

Milorganite Sample for Class A Biosolids Analysis

Micro Lab ID: **1** LIMS #: **17011871**

BACTERIOLOGICAL DATA

EPA Method 1680 : LIMS OpSID 481:TC Sludge & 482:FC Sludge

Source code 978

Sample Date: 6/7/17

Balance MMSD ID/serial # : 115/AB002 / 11220070261

Sample Preparation: 30g of Milorganite Sample in 270 mL dilution H₂O Micro Carboy ID: C 6/6
 pH Blend: 6.37
 Media used for analysis (batch ID): 2X LTB 053117, LTB 053117, BGB 053117, EC 053117 Micro dilution H₂O 060517
 Prep analyst Initials/Time: DJH 0805

2XLTB & LTB 35.0±0.5°C		BGB 35.0±0.5°C : TC		EC 44.5±0.2°C : FC	
Analysis Date	6/7/17	6/8/17	6/9/17	6/10/17	6/10/17
initials/time: IN	HC 0810	HC 0740	DJH 0805	DJH 0800	DJH 0805
Inoculation volume	24 ±2 hour (Inc. # 2-1)	48 ±3 hour (Inc. # 2-1)	24 ±2 hour (Inc. # 2-1)	48 ±3 hour (Inc. # 2-1)	24 ±2 hour (WB.# 4-1)
10 mL of 10 ⁻¹ =1.0g	-	+	+	+	-
10 mL of 10 ⁻² =0.1g	-	+	+	+	-
1.0 mL of 10 ⁻² =0.01g	-	+	+	+	-
1.0 mL of 10 ⁻³ =0.001g	-	-	-	-	-
Analysis Date	6/8/17	6/9/17	6/10/17	6/11/17	6/10/17
initials/time: OUT	HC 0740	DJH 0750	DJH 0800	820 925	DJH 0805

Tube Code EPA 1680 MPN index
 TC: 3-0-0 0.79
 FC: 0-0-0 <0.1803
 Dilution Factor Total Coliforms MPN/g TS 8.483
 row 1=1
 row 2=10
 row 3=100
 row 4=1000
 Fecal Coliforms MPN/g TS <1.936

$$TC = \frac{0.79}{0.931282} = 0.8483 \times 10^6 = 8.483$$

$$FC = \frac{0.1803}{0.931282} = 0.1936 \times 10^6 = 1.936$$

⊗ samples moved to WB4-1 LS 6/9/17 @ 1505
 DJH 5/9/17

Benchsheet reviewed by/date: JN 6-12-17

Milorganite Sample for Class A Biosolids Analysis

Micro Lab ID: **2** LIMS #: **17011872**

BACTERIOLOGICAL DATA

EPA Method 1680 : LIMS OpSID 481:TC Sludge & 482:FC Sludge

Source code 978

Sample Date: 6/7/17

Balance MMSD ID/serial # : 115/AB002 / 11220070261

Prep analyst Initials/Time: DJH 0815

Sample Preparation: 30g of Milorganite Sample in 270 mL dilution H₂O Micro Carboy ID: C 6/6

%Total Solids: 92.8738

pH Blend: 6.38

Media used for analysis (batch ID): 2X LTB 053117, LTB 053117, BGB 053117, EC 053117 Micro dilution H₂O 060517

		2XLTB & LTB 35.0±0.5°C			BGB 35.0±0.5°C : TC			EC 44.5±0.2°C : FC	
Analysis Date	6/7/17	6/8/17	6/9/17	6/9/17	6/10/17	6/10/17	6/8/17	6/9/17	6/10/17
initials/time: IN	HC 0820	HC 0740	DJH 0825	DJH 0825	DJH 0800	DJH 0825	DJH 0825	DJH 0825	DJH 0825
Inoculation volume	24 ±2 hour (Inc. # 2-1)	48 ±3 hour (Inc. # 2-1)	24 ±2 hour (WB.# 2-1)	24 ±2 hour (WB.# 2-1)	24 ±2 hour (WB.# 2-1)				
10 mL of 10 ⁻¹ =1.0g	-	+	+	+	+	+	-	-	-
10 mL of 10 ⁻² =0.1g	-	+	+	+	+	+	-	-	-
1.0 mL of 10 ⁻² =0.01g	-	+	+	+	+	+	-	-	-
1.0 mL of 10 ⁻³ =0.001g	-	-	-	-	-	-	-	-	-
Analysis Date	6/8/17	6/9/17	6/10/17	6/10/17	6/11/17	6/10/17	6/9/17	6/9/17	6/10/17
initials/time: OUT	HC 0740	DJH 0810	DJH 0800	DJH 0800	EX 0925	EX 0925			DJH 0805

Tube Code EPA 1680 MPN index

TC: 3-0-0 0.79

FC: 0-0-0 <0.1803

Dilution Factor

row 1=1

row 2=10

row 3=100

row 4=1000

Total Coliforms MPN/g TS 0.8506

Fecal Coliforms MPN/g TS <0.1941

$$TC = \frac{0.79}{0.928738} = 0.8506$$

$$FC = \frac{0.1803}{0.928738} = <0.1941$$

⊗ samples moved to WB4-1
LS 6/9/17 @ 1505

Benchisheet reviewed by/date: WJG-12-17

Milorganite Sample for Class A Biosolids Analysis

Micro Lab ID: **3** LIMS #: **17011873**

BACTERIOLOGICAL DATA

EPA Method 1680 : LIMS OpSID 481:TC Sludge & 482:FC Sludge

Source code 978

Sample Date: 6/7/17

Balance MMSD ID/serial # : 115/AB002 / 11220070261

Sample Preparation: 30g of Milorganite Sample in 270 mL dilution H₂O Micro Carboy ID: C 6/6
 %Total Solids: 92.9302
 pH Blend: 6.37
 Media used for analysis (batch ID): 2X LTB 053117, LTB 053117, BGB 053117, EC 053117 Micro dilution H2O 060517
 Prep analyst Initials/Time: DJH 0825

2XLTB & LTB 35.0±0.5°C		BGB 35.0±0.5°C : TC		EC 44.5±0.2°C : FC	
Analysis Date	6/7/17	6/8/17	6/9/17	6/10/17	6/10/17
initials/time: IN	HC 0830	HC 0745	DJH 0925	DJH 0800	DJH 0925
Inoculation volume	24 ±2 hour (Inc. # 2-1)	48 ±3 hour (Inc. # 2-1)	24 ±2 hour (Inc. # 2-1)	48 ±3 hour (Inc. # 2-1)	24 ±2 hour (WB.# 2-1) ⊗
10 mL of 10 ⁻¹ =1.0g	-	+	+	+	-
10 mL of 10 ⁻² =0.1g	-	+	+	+	-
1.0 mL of 10 ⁻² =0.01g	-	+	+	+	-
1.0 mL of 10 ⁻³ =0.001g	-	+	+	+	-
Analysis Date	6/8/17	6/9/17	6/10/17	6/11/17	6/10/17
initials/time: OUT	HC 0745	DJH 0910	DJH 0800	DJH 0925	DJH 0805

Tube Code EPA 1680 MPN index
 TC: 0-0-0 <0.1803
 FC: 0-0-0 <0.1803
 Total Coliforms MPN/g TS <1.940
 Fecal Coliforms MPN/g TS <1.940

TC & FC = $\frac{0.1803}{0.929302} = <0.1940 \times 10 = <1.940$

⊗ samples moved to WB 4-1 LS 6/9/17 @ 1505

Benchsheet reviewed by/date: JU 6-12-17